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ABSTRACT

The purpose of this study was to determine the combination of criteria that would accurately predict the success of at-risk master's level students in graduate education. Academic records of 918 graduate students who were classified as at risk (i.e., did not meet minimum admission requirements but were given an opportunity to take classes to show their proficiency at the graduate level) were analyzed. Success was defined as completion of the graduate degree, and the predictor variables studied were Graduate Record Examination (GRE) score, graduate grade point average (GGPA) in the first nine hours of graduate study, undergraduate grade point average (UGPA), age, gender, academic area of study, and type of institution from which the baccalaureate degree was earned. When all records were analyzed, the GRE verbal score combined with either UGPA or GGPA were significant predictors of degree completion. The highest graduation rate occurred among students who earned their undergraduate degrees from master's level institutions; students from bachelor's institutions had the lowest graduation rate. The results varied, however, when individual academic areas were assessed. (Contains 44 references.) (Author/EV)

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A Longitudinal Investigation of the Success Rate of At-Risk Graduate Students: A Follow-Up Study

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Abstract

The purpose of this study was to determine the combination of criteria that would accurately predict the success of at-risk master's level students in graduate education. Academic records of 918 graduate students who were classified as at-risk, i.e., did not meet minimum admission requirements but were given an opportunity to take classes to show their proficiency at the graduate level, were analyzed. Success was defined as completion of the graduate degree, and the predictor variables studied were GRE scores, graduate grade point average (GGPA) in the first nine hours of graduate study, undergraduate grade point average (UGPA), age, gender, academic area of study, and type of institution from which the baccalaureate degree was earned. When all records were analyzed, the GRE verbal score combined with either UGPA or GGPA were significant predictors of degree completion. The highest graduation rate occurred among students who earned their undergraduate degrees from master's level institutions; students from bachelor's institutions had the lowest graduation rate. The results varied, however, when individual academic areas were assessed. This study will provide educators with valuable information when considering the admission of students with poor academic records.

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A Longitudinal Investigation of the Success Rate of At-Risk Graduate Students:
A Follow-Up Study

Perspectives and Theoretical Framework

Departmental admission committees of master's level graduate programs are faced with the challenging task of evaluating materials and admitting those students who have the greatest potential for completion of degree requirements. Scores from the Graduate Record Examination (GRE) and undergraduate grade point average (UGPA) have long been assumed to be valid predictors of future academic success. In spite of a vast amount of research on these (and other) predictors whose conclusions sometimes vary considerably, GRE scores and UGPA are still widely used by colleges and universities to assess students' competency to perform proficiently at the graduate level. The Miller Analogies Test (MAT) has also been used as an admission criterion, although relatively little research has been conducted to determine its validity (Wesch, Courtney, & Hausken, 1984; House & Keeley, 1993). Since the education of a graduate student uses considerable resources of an institution, admission committees should not admit a student for graduate study whose probability of completing a particular degree program is very low. However, there are students whose undergraduate performances were barely acceptable, but who become serious about their academic work and are quite successful in graduate school. Obviously, when admissions deliberations are done conscientiously, decisions are indeed difficult and complex.

Graduate student success has been examined by a number of writers with diverse results. Many of the studies use first-year graduate grade point average (GGPA) as a measure of accomplishment (Kingston, 1985; Monahan, 1991; Rhodes, 1994; Vaseleck, 1994), while others use overall GGPA (Thacker & Williams, 1974; Ingram, 1983; Hosford, Johnson, & Atkinson, 1984; House & Johnson, 1993b; House & Keeley, 1993; Carlson, 1995; Morrison & Morrison,

1995). A few studies have employed the graduated versus not graduated criterion (Mitchelson & Hoy, 1984; Case & Richardson, 1990; House & Johnson, 1992, 1993a; Nelson & Nelson, 1995; Holmes & Beishline, 1996). Investigations of graduate student success also differ in scope, size of sample, and the types of predictor variables assessed. Some studies investigate specific disciplines (Kaiser, 1982; Broadus & Elmore, 1983; Michael, 1983; Thompson & Kobrak, 1983; Auld, 1984; Wesch, et al., 1984; Mitchelson & Hoy, 1984; Wilson & Hardgrave, 1995; de Felix & Houston, 1986; Case & Richardson, 1990; Goldberg & Alliger, 1992; Rhodes, 1994), while others examine the total graduate student population (Braun & Jones, 1985; Thornell & McCoy, 1985; Harvancik & Golsan, 1986).

In addition to the utilization of the GGPA, numerous analyses of the predictability of GRE scores, either alone or in combination with other factors, e.g., UGPA, age, gender, to determine graduate student success have been performed with inconsistent results (Morrison and Morrison, 1995). Perhaps the most significant conclusion of prior research, especially in regard to the results of the present study, is that considerable variability in the predictive validity of GRE scores exists among different disciplines. Studies inclusive of all graduate programs have not been reliable, but at the departmental level the results have been shown to be useful and dependable (Braun & Jones, 1985; Thornell & McCoy, 1985). Finally, research that indicates that performance on the GRE is age-, gender-, and race-specific (Kaczamarek and Franco, 1986; Scheuneman, 1987; House, 1989, 1994, 1998; House, Gupta & Xiao, 1997) intensifies the problematic use of GRE scores in predicting graduate student success.

Objectives and Background of Study

The purpose of this study was to determine the combination of criteria that would accurately predict the success of at-risk students in graduate education. But what is graduate

student success? Who are at-risk students? Concerning the former, the plethora of incompatible conclusions in the research studies noted above is exacerbated by the inconsistency of researchers' definitions of what graduate student success is. Hirschberg and Itkin (1978) declared ". . . there has been practically no attempt whatsoever at a thorough theoretical criterion of graduate school success" (p. 1085). More recently, Enright and Gitomer (1989) noted that ". . . the very nature of 'good performance' in graduate school is ill-defined" (p. 3). A newer study by Hagedorn and Nora (1996) emphasized the need for alternative definitions of success—ones based on the premise that the purpose of graduate education is to ". . . develop both professional and attitudinal competency" (p. 35). Too, customary predictor variables need to be modified or new ones need to be identified that relate to different and evolving definitions of what constitutes success (Hagedorn & Nora, 1996).

While first year GGPA and overall GGPA have been studied extensively, degree completion, one of two criteria used in this study, has received scant attention. For graduate programs that have room for more students but do not want to admit students whose chances of earning the degree are slim, predicting completion of the degree is appropriate. For restrictive graduate programs, however, it is more appropriate to predict GGPA, the other criterion used in this study, than degree completion. Some students drop out of school, but students do not always withdraw from a graduate program for academic reasons. Non-academic causes, e.g., financial considerations, health or family problems (Tucker, Gottlieb & Peace, 1964), emotional difficulties (Halleck, 1976), or dissatisfaction with their faculty advisor (Heiss, 1970) may determine the withdrawal of a student who, up to the time of discontinuance, could have been performing satisfactory academic work (at least a 3.0 GGPA).

Although conceding that there is great variation in the quality of degree recipients, Mitchelson and Hoy (1984) declared that the most defensible criterion of graduate student success is degree completion. Williams and Harlow (1970) in a study of doctoral students, and Goldberg and Alliger (1992) agreed. Asserting the need to provide a better operational definition of success in graduate school, the latter stated that the graduated versus not graduated criterion is a step in the right direction. Too, because the variability of grades in graduate school is small due to the excess of "A" and "B" grades, it is often difficult to differentiate between outstanding and inadequate students. As a matter of fact, of the at-risk students in this study who did not finish degree requirements, 75% had GGPAs above B (3.0). This would seem to strengthen the argument for using the graduated versus not graduated criterion.

Except for Thompson and Kobrak (1983), who researched graduate student success of those with questionable prior academic records, and Nelson and Nelson (1995), none of the studies cited previously has exclusively examined students who have been determined to be at-risk. For purposes of this study, at-risk graduate students were defined as those who did not meet the minimum graduate school admission requirements for the master's degree, i.e., less than 2.75 cumulative UGPA or less than 3.0 in the latter half of the baccalaureate degree on a 4.0 scale. If recommended by the students' major departments and approved by the Graduate School, these individuals, hereafter referred to as probationary students, were given the opportunity to take nine semester hours of graduate courses to determine their proficiency at an advanced level. In addition to the completion of the directed plan of study, students were also required to submit scores from the Graduate Record Examination. After the completion of the nine probationary hours, the GGPA and the standardized test scores were used to determine if a probationary student could be regularly admitted and continue graduate study.

The study was conducted at a medium-size Midwestern university that has an average total enrollment of 17,500 students, which includes a graduate enrollment of 2,600 students. The subjects in the study came from those students who applied for graduate study for the years 1987-1999 and were United States citizens whose first language was English (international probationary students were excluded because they were not required to take the GRE). The total number of students who failed to meet minimum graduate school admission standards was 1,816. Those who started a graduate program and for whom records of GRE scores were available numbered 918, of whom 618 (or 67.3%) graduated and 300 did not (data were complete for 609 graduates and 297 non-graduates).

Procedures and Methodology

Two dependent variables were analyzed separately for this study. The first dependent variable was completion or non-completion of the master's degree. Completion of the degree was coded as "1" and non-completion was coded as "0". Any student who had not graduated with a master's degree and had not taken course work within one year of this study was assumed to be inactive and placed in the non-completion category. The second dependent variable was GGPA calculated after the student had completed nine semester hours of graduate courses. Since most of the grades awarded for graduate work are either "A's" or "B's", the variance of GGPA is not great, and the assumption of GGPA approximating a normal distribution is not necessarily warranted. Therefore, GGPA of 3.5 and above was coded as "1" and GGPA below 3.5 was coded as "0". Although the categorization of the GGPA into these two subsets is somewhat arbitrary, it does indicate that a student with a GGPA of 3.5 and above would have earned more "A" grades than grades lower than "A", while a GGPA less than 3.5 indicates that more than half of the course grades were lower than "A".

Stepwise logistic regression was used to determine the effect on each of the dependent variables by the following predictor variables: GRE verbal score; GRE quantitative score; GRE analytical score; UGPA; type of institution from which the student received the undergraduate degree (Carnegie Classification of research, doctoral, master's, and baccalaureate); age; gender; race; and academic area of concentration. The academic areas were organized as follows: applied sciences; communication sciences; education; humanities and arts; life sciences; physical sciences; psychology; and social sciences. These categories are similar to the categories used by Educational Testing Service in analysis of GRE scores (Educational Testing Service, 1999) and also follow the college organizational lines at the institution under study.

Research by Einhorn (1971) suggested that a completely additive or compensatory model might not be adequate to describe the effect of some of the predictor variables on the dependent variable. In an additive model, a low GRE verbal score could be compensated for with a higher UGPA. Einhorn (1971) recommended use of a conjunctive model, where the product of variables is computed. For example, if one calculates a variable that is the product of the GRE verbal score with the UGPA, a low GRE verbal score could not be compensated for by a higher UGPA. If the GRE verbal is an indicator of writing ability, using Einhorn's model, poor writing ability could not be overcome with a higher grade point average.

The predictor variables representing type of institution, academic area of concentration, gender and race are categorical variables. Since there were more than two categories for academic area of concentration and for the type institution from which the student received the undergraduate degree, contrast matrices had to be utilized. For academic area of concentration, deviation contrasts were made between each area and the education area. For the type of

institution, deviation contrasts were made between each institution and the doctoral granting institution.

Descriptive Findings

In the overall analysis, as expected, those probationary students who completed degree requirements had higher measures of achievement than the probationary students who did not complete the degree. The differences in the 9-hour GGPA and final GGPA between graduates and non-graduates, however, were greater than the differences in the GRE scores of the two groups.

These findings are illustrated in Table 1.

Table 1

Measures of Achievement for Probationary Graduates and Non-Graduates

	Graduates	Non-Graduates
Nine-hour GGPA	3.58	3.28
Final GGPA	3.62	3.22
GRE Verbal	440	430
GRE Quantitative	464	456
GRE Analytical	488	480

The fact that the nine-hour GGPA and the final GGPA were very close supports previous research studies that have indicated no significant difference in the GGPA in the student's first nine hours or first year of graduate study and the student's GGPA at the completion of the graduate course of study (Kingston, 1985; Nelson & Nelson, 1995; Rhodes, 1994; Thompson & Kobrak, 1983, Vaseleck, 1994).

The results were mixed when the academic areas were examined separately. Only those graduates in life sciences, psychology, communication sciences, physical sciences, and social sciences performed better than the non-graduates in all criteria. In each of the other areas, at least one achievement factor was the same or higher for those who did not graduate than for those who did (see Appendix A for complete data by area).

Overall analysis of probationary students showed that the highest graduation rate (74.4%) occurred among students who earned their undergraduate degrees from master's level institutions. Probationary students from bachelor's institutions had the lowest graduation rate (59.2%). As with the measures of achievement, however, differences were noted by academic area. Only communication sciences and education followed the overall pattern of graduation rate by type of institution. Interestingly enough, one area (life sciences) had the highest and lowest graduation rates for those students from baccalaureate and master's level institutions, respectively, in direct contrast with the overall pattern. And, other than communication sciences and education, only in applied sciences did students graduate at the highest rate from the master's level institutions. The highest graduation rate for physical sciences, social sciences, psychology, humanities/arts, and life sciences occurred for students from research institutions (see Appendix B for complete data by area).

Overall, age and gender were not important factors in predicting degree completion, although minor variations were noted. For all probationary students, the average age difference between those who graduated and those who did not was only 1.2 years (30.6 and 29.4, respectively). Differentiating by gender resulted in the same pattern. Both probationary males and females who earned the degree were slightly older than those who did not finish (30.4 to 28.9 for males; 30.9 to 29.9 for females). For measures of achievement, males consistently

scored higher than females on all sections of the GRE, but females scored higher on the nine-hour GGPA and final GGPA. Males also graduated at a slightly higher rate, 69.1%, than did the females, 64.8% (see Appendix C for complete data).

Interesting results occurred when the predictor variables were analyzed by the dichotomized GGPA. For students whose nine-hour GGPA was 3.5 and above, the results mirrored those in the overall analysis, i.e., measures of achievement were higher for the graduated group than the not graduated group. For students whose nine-hour GGPA was below 3.5, however, the GRE scores were higher, albeit insignificantly, for those who did not complete the degree than for those who did. But, those who graduated had a much higher nine-hour and final GGPA than did those who dropped out of graduate school. The results are shown in Table 2 below.

Table 2

Measures of Achievement for Probationary Graduates and Non-Graduates by Dichotomized GGPA

	Graduates		Non-Graduates	
	GGPA > 3.5	GGPA < 3.5	GGPA > 3.5	GGPA < 3.5
Nine-hour GGPA	3.83	3.15	3.82	2.72
Final GGPA	3.77	3.35	3.68	2.74
GRE Verbal	454	416	441	419
GRE Quantitative	476	443	467	446
GRE Analytical	500	466	486	473

When individual academic areas were analyzed by the dichotomized GGPA, results

showed that no academic area replicated the analysis noted in Table 2. In regard to age and gender, the average age of both males and females was lower for the group whose nine-hour GGPA was less than 3.5 than for those above. And, similar to the overall pattern by gender, males outperformed females in GRE scores except for analytical score, and females earned higher grades in all categories except one. In both cases the exceptions were in the non-graduated group whose nine-hour GGPA was greater than 3.5 (see Appendixes A and C for complete data). Finally, the highest graduation rate in the group whose GGPA was greater than 3.5 was for those students from master's level institutions, while in the other group the students from the research institutions graduated at the highest rate. For both groups, as in the overall analysis, students from the baccalaureate institutions graduated at the lowest rate (see Appendix B for complete data).

Statistical Findings

The results of predicting success vs. non-success in completing the degree requirements are shown in the logistic regression presented in Table 3 below.

Table 3

Logistic Regression Equation for Degree Completion

Variable	B	S.E.	Wald	df	Sig
Institution type			8.1714	4	.0854
Research vs. doctoral	-.0910	.1859	.2396	1	.6245
Masters vs. doctoral	.2990	.2115	1.9985	1	.1517
Bachelors vs. doctoral	-.4757	.1987	5.7340	1	.0166
Other vs. doctoral	.4150	.4361	.9056	1	.3413
Area			31.2417	7	.0001
App. Sci. vs. Educ.	.1197	.1614	.5498	1	.4584
Comm. Sci. vs. Educ.	.9160	.1942	22.2510	1	.0000
Hum and Art vs. Educ.	-.4656	.3097	2.2600	1	.1328
Life Sci vs. Educ.	-.0261	.2329	.0126	1	.9108
Phys. Sci vs. Educ.	-.4381	.2188	4.0090	1	.0453
Psych. vs. Educ	-.4246	.3046	1.9428	1	.1634
Soc. Sci. vs. Educ.	-.0845	.2189	.1489	1	.6996
GRE-V x Prob. GGPA	.3220	.0505	43.1546	1	.0000
GRE-V x UGPA	-.2518	.1061	5.6334	1	.0176
Constant	-.7991	.6241	1.6395	1	.2004

It is interesting to note the predictor variables that remained in the equation. The type of institution, area of study, and academic measures of achievement were important. The type of institution that differed the most from the doctoral classification was the baccalaureate degree institution. Communication sciences and physical sciences differed the most from the education

area. Of the performance variables, both the nine-hour GGPA and UGPA multiplied by the GRE verbal score were significant predictors of degree completion. Race, gender, and UGPA alone, however, were not significant predictors for those probationary students who earned the master's degree.

The logistic regression equation given in Table 3 above produced the following results as expressed in Table 4 below.

Table 4

Logistic Regression Results for Accurate Prediction by Percentage

	Predicted		
	Non-completion	Completion	Percentage
Observed			
Non-Completion	74	223	24.92
Completion	36	573	94.09
		Overall accuracy	71.41

As can be observed in Table 4, 297 students did not complete the degree and the logistic regression correctly predicted about 25%, or 74, of these. More important, 609 completed the degree and 573, or 94%, of these were correctly predicted.

The analysis of the second dependent variable, the dichotomized probationary grade point average, with the predictor variables described above produced the logistic regression equation given in Table 5 below.

Table 5

Logistic Regression for Dichotomized GGPA

Variable	B	S.E.	Wald	df	Sig
Institution Type			9.3221	4	.0535
Research vs. doctoral	-.1211	.1882	.4136	1	.5201
Masters vs. doctoral	-.1889	.2004	.8880	1	.3460
Bachelors vs. doctoral	-.2115	.2056	1.0586	1	.3035
Other vs. doctoral	.9890	.4623	4.5760	1	.0324
Area			45.3038	7	.0000
App. Sci vs. Educ.	.3590	.1621	4.9089	1	.0267
Comm. Sci. vs. Educ.	-.6791	.1692	16.1081	1	.0001
Hum. And Art vs Educ.	.1883	.3275	.3305	1	.5654
Life Sci vs. Educ.	-.0269	.2371	.0128	1	.9098
Phys. Sci. vs. Educ.	-.4592	.2219	4.2838	1	.0385
Psych. vs. Educ.	.2984	.3220	.8590	1	.3540
Soc. Sci. vs. Educ.	-.3964	.2167	3.3453	1	.0674
Race	.5924	.1241	22.7968	1	.0000
Gender	.1542	.0789	3.8130	1	.0509
UGPA	-.9091	.4846	3.4879	1	.0618
GRE-V x UGPA	.4874	.1082	20.2847	1	.0000
Constant	-.8618	.9969	.7471	1	.3874

As in the analysis for predicting degree completion, the type of institution from which the

student received the undergraduate degree was significant for predicting the dichotomized GGPA. However, this time the type of institution classified as "other" (all institutions not categorized as research, doctoral, master's, or baccalaureate) was significant rather than the baccalaureate degree granting institution. The area of graduate study was also important. Communication sciences and physical sciences were again significant, but applied sciences and social sciences also entered the regression equation.

Other factors that were significant predictors of the dichotomized probationary GGPA but were not significant in predicting completion of the degree were race, gender, and UPGA. Again the product of the GRE verbal score and the undergraduate grade point average was a significant predictor. Since the dichotomized probationary grade point average was the dependent variable, probationary grade point average could not be used either by itself or in combination with other variables as a predictor.

The logistic regression equation given in Table 5 above produced the following results as expressed in Table 6 below.

Table 6

Logistic Regression Results by Dichotomized GGPA for Accurate Prediction by Percentage

		Predicted		
	GPA < 3.5	A >= 3.5		Percentage
Observed				
GPA < 3.5	173	194		47.14
GPA >= 3.5	92	448		82.96
			Overall	68.47

About 83% of the time the prediction was correct for probationary GGPA of 3.5 or above. However, the prediction of a probationary GGPA of less than 3.5 was only accurate 47% of the time. Overall, the logistic regression was successful in prediction more than two-thirds of the time.

Summary

Data analysis showed both similarities and differences between the two dependent variables, master's degree completion and dichotomized GGPA, investigated in this study. Common predictor variables were institution type, academic area of study, and the GRE verbal score multiplied by UGPA. And, while the specific institution differed and the academic disciplines were not identical, the overall categories were the same.

Inconsistent independent variables included race, gender, and UGPA alone, all found to be significant predictors only for the dichotomized GGPA. And, age was not an important factor for either of the dependent variables. Furthermore, descriptive results differed when academic areas of study were analyzed. This finding supports those of Braun and Jones (1985) and Thornhill and McCoy (1985) that variability exists between disciplines and at the departmental level analyses were useful and dependable.

Conclusions

It has been previously stated that little research had been done to analyze the predictor variables in graduate school for at-risk students utilizing the graduated versus not graduated criterion in addition to GGPA. This study sought to correct that omission. Nelson and Nelson (1995) initiated new efforts in their study in trying to predict the success of students admitted to graduate school on a probationary basis. The Nelson study, however, lacked sufficient data upon which to draw reliable conclusions. The current investigation extended the initial Nelson and

Nelson study in that an additional five years of data were added and a new variable, the dichotomized probationary GGPA, was analyzed.

Admissions decisions are indeed difficult and complex. Graduate departments need to utilize all available information in making admissions decisions. The information from this study should complement qualitative factors such as letters of recommendation and individual student motivation to predict the likelihood of success in graduate school. In considering applicants for graduate study who do not meet minimum entrance requirements, two perspectives must be recognized. For students, admission is an important step toward attainment of career goals. But, because institutional quality and reputation are determined, in part, by the academic characteristics of each student, universities must adopt appropriate admission criteria which allow for accurate selection of those students who are likely to be successful (Hagedorn & Nora, 1996). With many colleges facing declining enrollments, the admissions process takes on an added ethical and fiscal dimension. Should students with weak academic credentials who may have little chance of developing the required professional competencies be enrolled to meet the financial goals of the institution? Does the institution want to jeopardize its reputation by admitting students who do not meet minimum admission standards? While it was beyond the scope of this study, this problem is faced by many academic programs in need of students.

Qualitative factors are helpful in making admissions decisions. Utilizing the quantitative components investigated in this study, however, is a must to fulfill the university's objective of approving only those students to begin graduate study who have the greatest potential to complete degree programs. Simultaneously, the academy does not want to lower the standards of performance in the graduate courses to which probationary students are assigned. Since graduate education is an expensive outlay for the individual student and the graduate institution,

early and precise prediction of the student's chances for success in the program is beneficial. There are no factors, when used alone, that will provide the accuracy desired; however, when combinations of factors are considered, admissions committees would do well to apply the findings in their deliberations.

Additional research should focus on statistical analysis for each individual academic area of graduate study. Predictor variables may indeed have different levels of significance by discipline, thus allowing for the development of entrance requirements for each academic department when considering the admission of a student with a poor undergraduate record.

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Appendix A

Measures of Achievement for Probationary Students

Table A1

Measures of Achievement for All Probationary Students Without Dichotomized GGPA

Area	Nine-Hour GGPA		Final GGPA		GRE-V		GRE-Q		GRE-A		N	
	Grad	Non-Grad	Grad	Non-Grad	Grad	Non-Grad	Grad	Non-Grad	Grad	Non-Grad	Grad	Non-Grad
Applied Sciences	3.63	3.39	3.61	3.34	419	413	449	469	454	486	147	70
Comm Sciences	3.37	3.04	3.48	3.06	445	409	467	432	506	451	130	39
Education	3.69	3.61	3.71	3.55	414	409	431	451	457	464	152	53
Humanities/Arts	3.57	3.58	3.69	3.43	496	435	477	440	510	434	20	17
Life Sciences	3.60	3.10	3.68	3.02	462	460	468	448	505	482	48	29
Physical Sciences	3.61	3.00	3.63	2.91	499	468	594	550	579	568	45	40
Psychology	3.66	3.33	3.63	3.31	460	452	477	443	516	482	22	17
Social Sciences	3.59	3.12	3.64	3.01	460	435	469	381	512	444	54	35

Table A2

Measures of Achievement for Probationary Students Whose Nine-Hour GGPA was Above 3.5

Area	Nine-Hour GGPA		Final GGPA		GRE-V		GRE-Q		GRE-A		N	
	Grad	Non-Grad	Grad	Non-Grad	Grad	Non-Grad	Grad	Non-Grad	Grad	Non-Grad	Grad	Non-Grad
Applied Sciences	3.85	3.78	3.75	3.62	433	430	452	476	454	498	97	42
Comm Sciences	3.76	3.78	3.70	3.68	482	428	489	424	536	426	58	13
Education	3.87	3.85	3.83	3.75	418	420	437	470	467	488	110	39
Humanities/Arts	3.85	3.83	3.86	3.60	509	428	506	437	540	425	13	11
Life Sciences	3.77	3.85	3.77	3.72	471	451	481	421	513	454	35	14
Physical Sciences	3.85	3.80	3.77	3.58	487	489	607	581	593	601	31	14
Psychology	3.82	3.76	3.71	3.76	495	460	519	459	551	478	16	9
Social Sciences	3.80	3.89	3.80	3.70	487	493	492	415	543	469	34	11

Table A3

Measures of Achievement for Probationary Students Whose Nine-Hour GGPA was Below 3.5

Area	Nine-Hour GGPA		Final GGPA		GRE-V		GRE-Q		GRE-A		N	
	Grad	Non-Grad	Grad	Non-Grad	Grad	Non-Grad	Grad	Non-Grad	Grad	Non-Grad	Grad	Non-Grad
Applied Sciences	3.21	2.81	3.35	2.92	392	388	444	457	456	469	50	28
Comm Sciences	3.06	2.67	3.30	2.75	414	400	449	436	482	463	72	26
Education	3.23	2.94	3.40	2.81	403	381	414	400	432	396	42	14
Humanities/Arts	3.04	3.12	3.38	3.11	470	448	423	445	454	448	7	6
Life Sciences	3.15	2.39	3.44	2.37	438	468	433	473	482	550	13	15
Physical Sciences	3.07	2.56	3.34	2.55	526	457	566	533	549	550	14	26
Psychology	3.26	2.85	3.40	2.81	365	444	365	425	423	488	6	8
Social Sciences	3.24	2.77	3.36	2.70	415	408	432	365	459	433	20	24

Appendix B

Graduation Rate in Percentages by Type of Institution

Table B1

Graduation Rate in Percentages by Type of Institution Without Dichotomized GGPA

	Research (n=124)	Doctoral (n=303)	Master's (n=96)	Baccalaureate (n=74)
All Areas	70.5	65.6	74.4	59.2
Applied Sciences	62.2	61.2	86.5	65.5
Communication Sciences	80.0	77.4	84.2	54.5
Education	77.5	75.5	78.5	64.1
Humanities/Arts	70.0	37.5	67.0	62.5
Life Sciences	64.7	62.1	54.5	66.6
Physical Sciences	66.6	43.9	58.3	54.5
Psychology	71.4	50.0	62.0	50.0
Social Sciences	71.4	63.8	54.5	33.3

Table B2

Graduation Rate in Percentages by Type of Institution by Dichotomized GGPA

	Research		Doctoral		Master's		Baccalaureate	
	≥ 3.5	< 3.5	≥ 3.5	< 3.5	≥ 3.5	< 3.5	≥ 3.5	< 3.5
All Areas	74.2	76.1	71.5	58.8	76.3	71.4	60.8	56.5
Applied Sciences	73.3	40.0	61.9	60.0	90.9	80.0	52.9	83.3
Communication Sciences	81.3	77.8	85.7	73.7	81.8	87.5	57.1	50.0
Education	76.7	80.0	77.8	70.9	76.2	85.7	61.3	75.0
Humanities/Arts	60.0	80.0	41.7	25.0	66.7	N/A	75.0	50.0
Life Sciences	81.8	33.1	68.2	53.3	55.6	50.0	80.0	50.0
Physical Sciences	75.0	50.0	60.0	28.6	80.0	42.9	66.7	40.0
Psychology	71.4	N/A	75.0	30.0	66.7	50.0	25.0	100.0
Social Sciences	55.6	100.0	86.9	41.7	33.3	62.5	80.0	0.0

Appendix C

Measures of Achievement for Probationary Graduates and Non-Graduates by Gender

Table C1

Measures of Achievement for Probationary Graduates and Non-Graduates by Gender Without Dichotomized GGPA

	Males		Females	
	Graduates	Non-Graduates	Graduates	Non-Graduates
Nine-hour GGPA	3.55	3.23	3.63	3.34
Final GGPA	3.59	3.15	3.67	3.30
GRE Verbal	449	438	426	420
GRE Quantitative	488	478	428	430
GRE Analytical	499	484	472	474
N	371	166	247	134

Table C2

Measures of Achievement for Probationary Graduates and Non-Graduates by Gender By Dichotomized GGPA

	Males				Females			
	Graduates		Non-Graduates		Graduates		Non-Graduates	
	> 3.5	< 3.5	> 3.5	< 3.5	> 3.5	< 3.5	> 3.5	< 3.5
Nine-hour GGPA	3.82	3.14	3.82	2.68	3.84	3.16	3.81	2.77
Final GGPA	3.75	3.34	3.64	2.69	3.81	3.37	3.72	2.81
GRE Verbal	462	430	448	428	442	391	432	405
GRE Quantitative	503	466	486	471	440	400	446	410
GRE Analytical	512	478	482	487	484	445	491	454
N	225	146	80	86	169	78	73	61